

Status of Diamond Measurements

IV Characterisation

Maria Hempel
CMS-FCal Meeting
Zeuthen, 1.07.2013

Content

- Information about Metallisation
- General Remarks
- IV-Curve of Diamond 23851343
- IV Curve of Diamond 23851353
- Current vs Time for Diamond 2351353



Information about Metallisation

- Optical measurements are done (Audric)
- Princeton mixed up two diamonds
 - Diamond 23851343 is diamond 23851342
 - Will change the name later

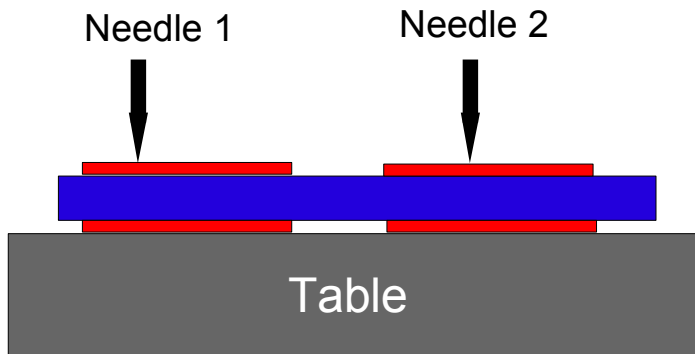


Diamond	Met. Area Left	Met. Area Right	Distance between left & right
23851342 Top	1950um x 3903um	1949um x 3903um	4.167um
23851342 Bottom	1949 um x 3802um	1946um x 3802um	5.919um
23851343 Top	1941um x 3899um	1952um x 3899um	10.339um
23851343 Bottom	1947um x 3904um	1944um x 3904um	5.56um
23851353 Top	1954um x 3907um	1956um x 3907um	5.54um
23851345 Bottom	1935 um x 3890um	1940um x 3890um	15.971um

General Remarks

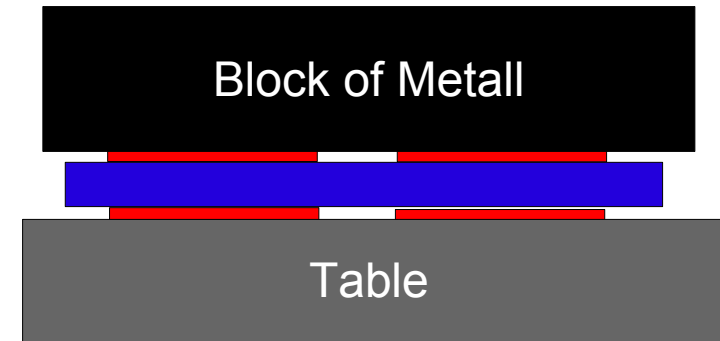
- Two different setups
 - Matthias probe station
 - TSC setup

Matthias Probe Station



Diamond
Metallisation

TSC Setup



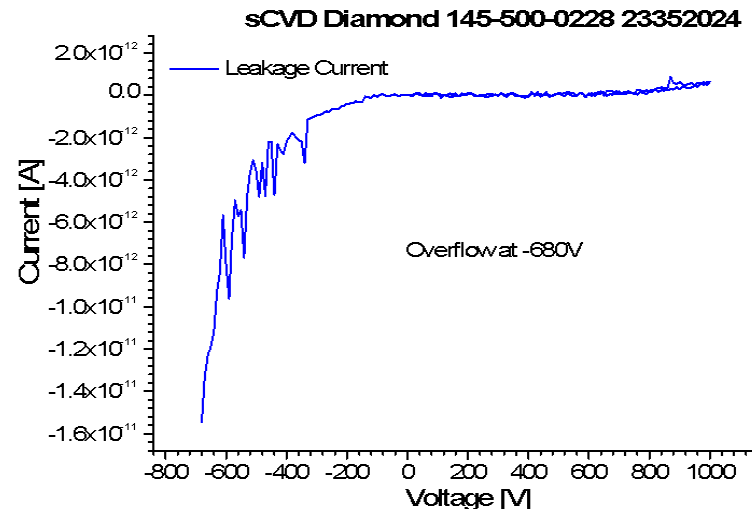
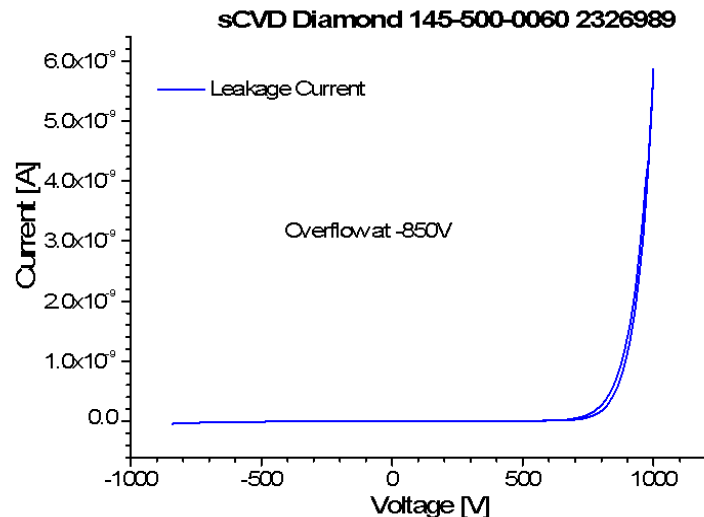
General Remarks

➤ Two different sets of diamonds

- ScCVD 145-500-0060: Moritz diamonds
- ScCVD 145-500-0228: Our diamonds

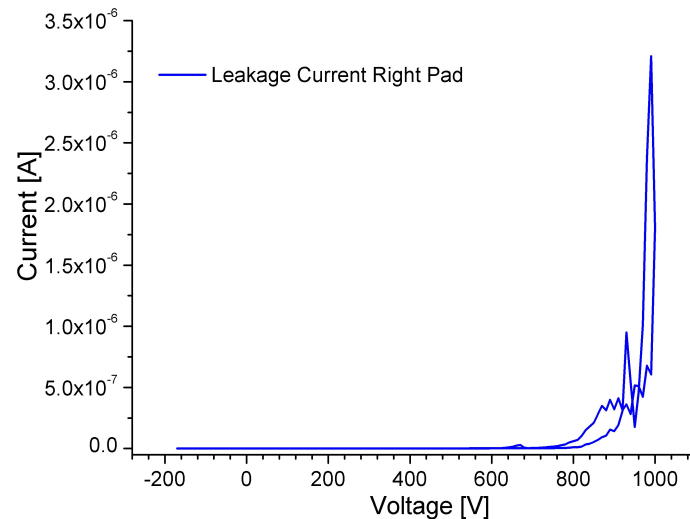
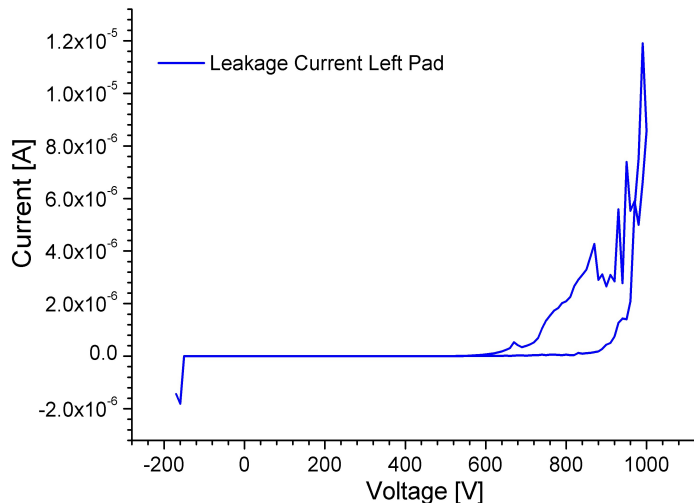
➤ Redo the IV measurements of ScCVD 145-500-0060 (first measurements are done by Konstantin)

- I was not able to reproduce the measurements with the probe station
- Next step: check the IV curve with TSC setup



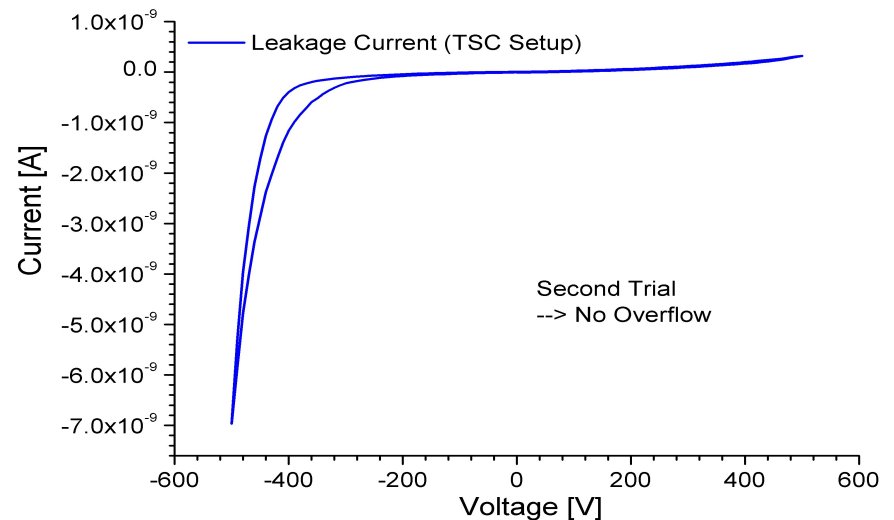
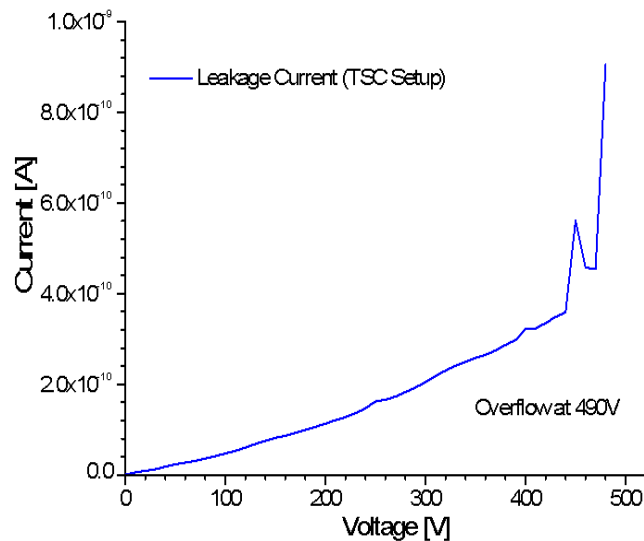
IV- Curve of Diamond 23851343

- Two different setups
 - Matthias probe station
 - TSC setup for IV measurements
- Max voltage is 1000V
- IV curve with probe station: overflow at $\sim -180\text{V}$
 - No complete IV curve possible



IV- Curve of Diamond 23851343

- Max voltage of TSC setup is 500V
- Several trials to get a complete IV curve



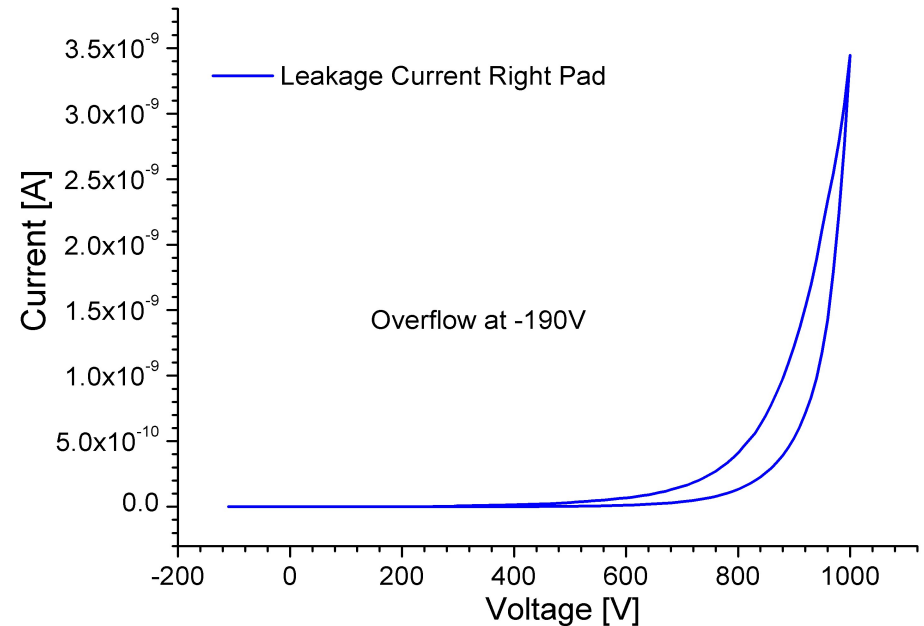
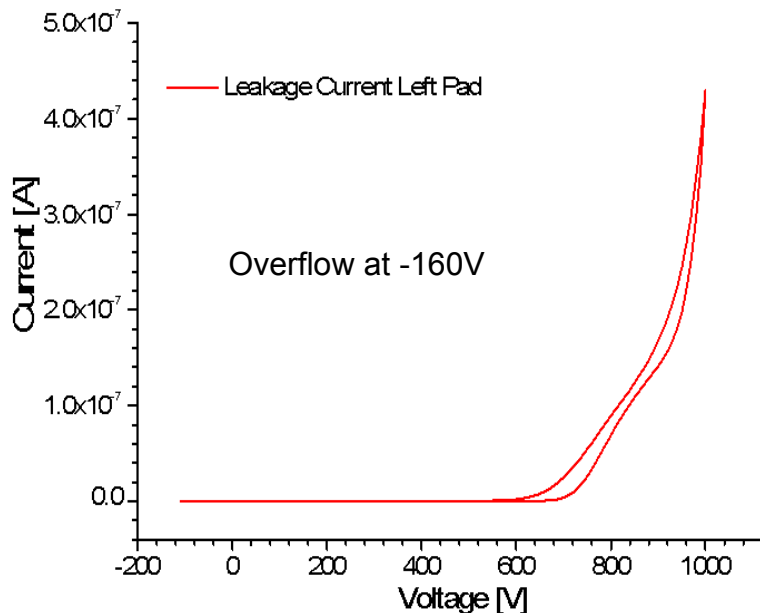
IV- Curve of Diamond 23851353

➤ Two different setups

- Matthias probe station
- TSC setup

➤ No complete IV curve possible with probe station

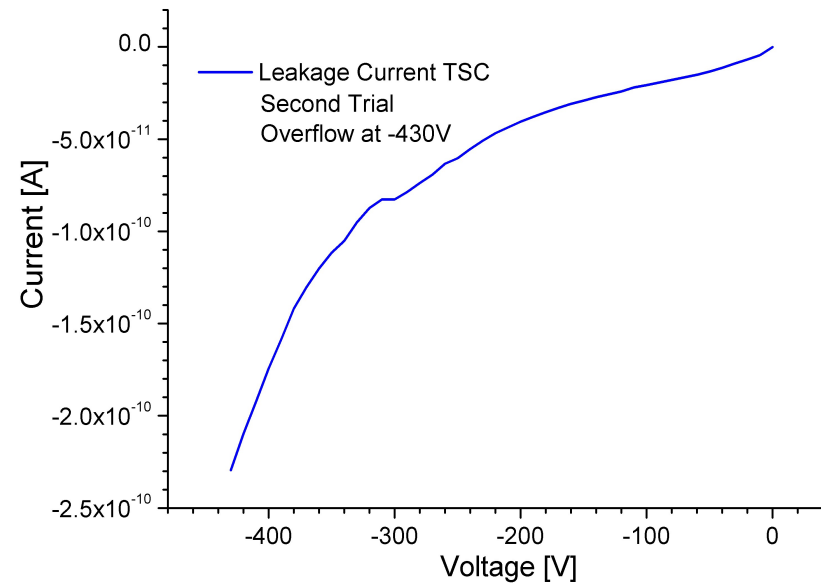
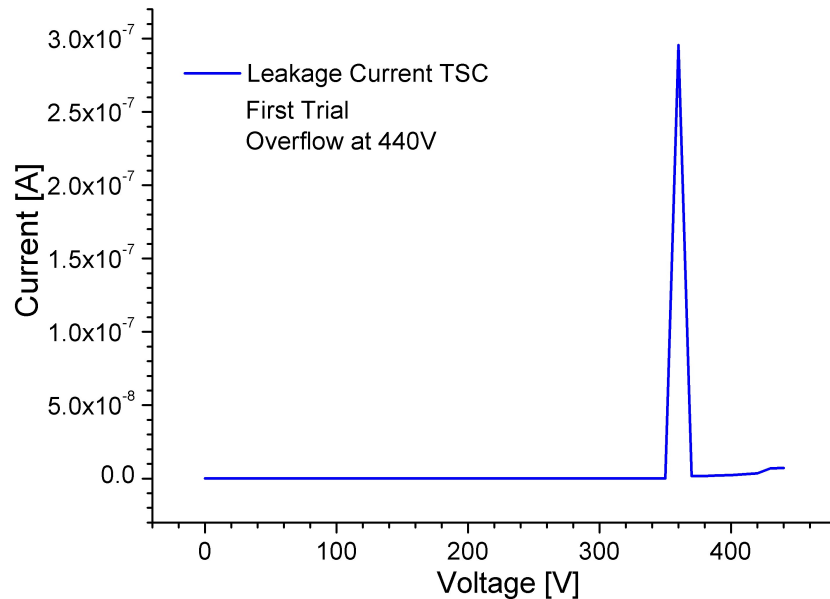
- Overflow at $\sim -180\text{V}$



IV- Curve of Diamond 23851353

➤ No complete IV curve with TSC setup

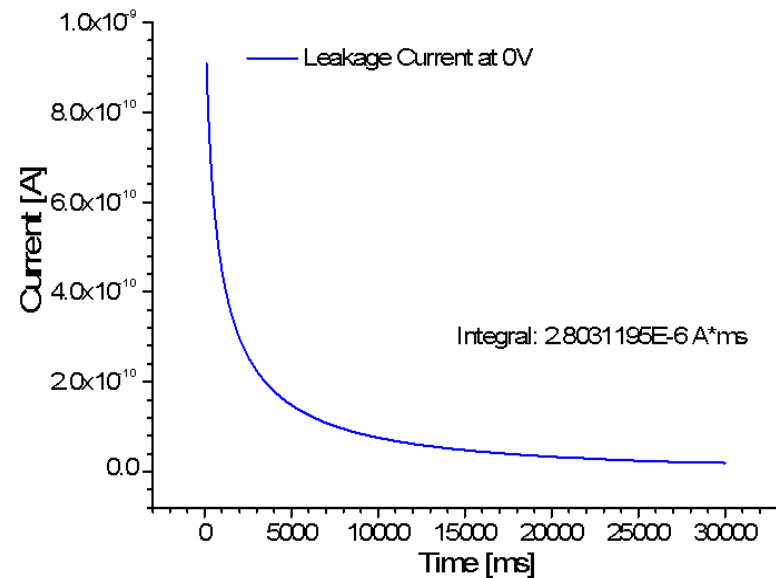
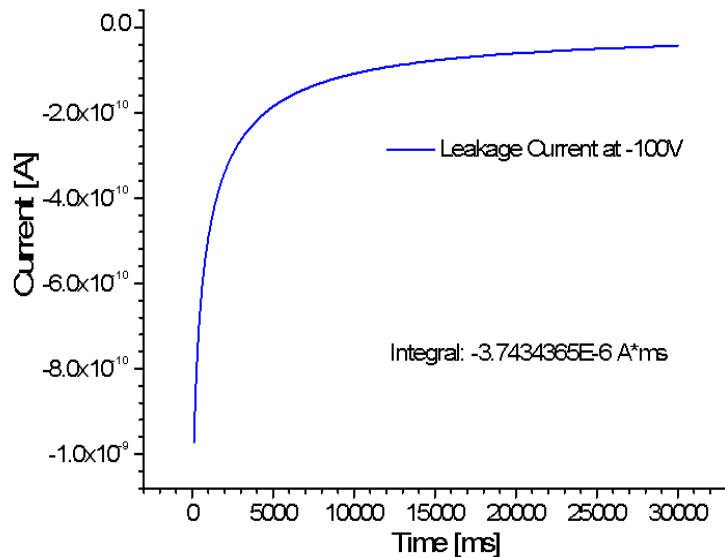
- Overflow at $\sim \pm 440\text{V}$



Current vs Time for Diamond 23851353

➤ Observation of time dependent leakage current

- Time dependence in second range
- Is it normal?
- Maybe due to polarization? --> measure ADC spectra for -100V over time



Summary

- No reproducible results
 - I cannot reproduce Konstantin measurements
- Different behavior for different setups
 - Which setup is better?
- High leakage currents in every measurement
 - Is the quality of the diamonds bad?



Backup



ADC Spectra of Diamond 23851343

